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रेलवे कोचों के लिए नाइफिंग स्टॉपर —  
विशिष्टि  
( तीसरा पुनरीक्षण )

**Knifing Stopper for Railway  
Coaches — Specification**  
( *Third Revision* )

ICS 87.040

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Price Group 5

## FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Paints, Varnishes, and Related Products Sectional Committee had been approved by the Chemical Division Council.

As part of the painting schedule for finishing rail coaches, manufacturers indent paste filler for colour coats (*see* IS 110) with the advent of welded integral coaches, the use of a knifing stopper was keenly felt in the painting schedule for filling up dents and uneven spots and surface imperfections, and this standard was drawn up in consultation with rail coach manufacturers and embodies the accumulated experience in the supply of the material by manufacturers and users. As the performance of the material is dependent on the painting system and schedule of which it forms a part, for proper evaluation of the material, the test schedule should simulate the one to be followed in actual use.

This standard was first published in 1969. In the first revision, the requirements for dents in the determination of stopping properties were improved and drying schedule of the material was modified. The requirement for water content was also modified. In the second revision, the drying time requirements was suitably modified to remove ambiguity. Consistency clause was also modified to specify the width of knife and determination of stopping properties, and a method of test for assessing the adhesion of the material to the primer and to the subsequent coats and within the different coats of the material was added.

This revision has taken up in order to bring out the standard in the latest style and format of the Indian Standards. It also incorporates 3 amendments issued to the last version of standard. In addition, the following changes have been made:

- a) Considering, the adverse impact of lead on human health, the maximum limit for lead has been prescribed;
- b) Adhesion and compatibility in paint system clause has been modified in order to harmonized with RDSO, Lucknow. Specification to achieve the goal “ONE NATION ONE STANDARD” policy of government of India;
- c) Considering the toxicity of the product a precautionary note has been added in the marking clause; and
- d) References of Indian standards have been updated wherever required.

The composition of the Committee responsible for the formulation of this standard is given in Annex F.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded-off value should be the same as that of the specified value in this standard.

*Indian Standard***KNIFING STOPPER FOR RAILWAY COACHES —  
SPECIFICATION***( Third Revision )***1 SCOPE**

This standard prescribes requirements, and methods of sampling and test for knifing stopper. This material is used for filling up dents and uneven spots, in conjunction with other materials. This material constitutes a part of the painting schedule for rail coaches.

**2 REFERENCES**

The standards listed in Annex A contain provisions which, through reference in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

**3 TERMINOLOGY**

For the purpose of this standard, the definitions given in IS 1303 shall apply.

**4 REQUIREMENTS****4.1 Form and Condition**

The material shall be homogeneous soft paste and shall be free from grit and other visible impurities.

**4.2 Composition**

The material shall be of such composition as to comply with the requirements of this standard.

**4.3 Consistency**

The material shall be suitable for application by a knife of about 30 cm width and produce a smooth and uniform surface. It should be capable of being drawn smoothly with knife for about 125 cm length at a stretch for air-drying synthetic system.

**4.4** The material shall be compatible with petroleum hydrocarbon solvent 145/205 (low aromatic) (*see* IS 1745).

**4.5 Adhesion and Compatibility in Paint System**

The material shall have good adhesion to grey filler (*see* IS 110) and shall be compatible with the previous paint applied and the subsequent paints to be applied as given in Annex E.

**4.6 Drying Time**

The film of the material applied to a dry film thickness of 275  $\mu\text{m}$  in one coat shall become surface-dry in not less than 10 min and not more than 45 min, and hard dry (suitable for application of second coat) in not more than 8 h, subject to the material being satisfactory for application as given in **4.3**.

**4.7 Lead Restriction**

The material shall not contain lead or compounds of lead or mixtures of both, as metallic lead more than 90 ppm, when tested for restriction from lead in accordance with IS 101 (Part 8/Sec 5).

**4.8** The material shall also comply with the requirements given in Table 1.

**Table 1 Requirements for Knifing Stopper**  
(Clause 4.8)

Sl No.	Characteristic	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Water content, percent by mass, <i>Max</i>	10	101 (Part 2/Sec 1)
ii)	Stopping properties	Shall pass the test	Annex B
iii)	Rubbing properties	Shall pass the test	Annex C
iv)	Hold-out properties	Shall pass the test	Annex D

#### 4.9 Keeping Properties

The material shall conform to all the requirements prescribed at **4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7** and **4.8**, when tested immediately after expiry of shelf-life period declared by the manufacturer. The material shall be stored in original sealed container under shade at ambient atmospheric conditions.

### 5 PACKING AND MARKING

#### 5.1 Packing

The material shall be packed as agreed to between the purchaser and the supplier.

#### 5.2 Marking

**5.2.1** The containers shall be marked with the following:

- a) Name of the material;
- b) Manufacturer's name and trade-mark, if any;
- c) Mass of the material;
- d) Batch number or lot number in code or otherwise;
- e) Month and year of manufacture; and
- f) A cautionary note as below:
  - 1) Keep out of reach of children; and
  - 2) This product may be harmful if swallowed or inhaled.

#### 5.2.2 BIS Certification Marking

The container may also be marked with the Standard Mark.

The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act, 2016* and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

### 6 SAMPLING

Representative samples of the material shall be drawn as prescribed in IS 101 (Part 1/Sec 1).

### 7 TEST METHODS

**7.1** Tests shall be conducted as prescribed in **4.1** to **4.8**. The test methods referred to are given in col (4) of Table 1 and Annex E.

#### 7.2 Quality of Reagents

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE — Pure chemicals shall mean chemicals that do not contain impurities which affect the results of analysis.

## ANNEX A

(Clause 2)

## LIST OF REFERRED STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
IS 101	Methods of sampling and test for paints, varnishes, and related products:		over primers — Specification ( <i>third revision</i> )
(Part 1/Sec 1) : 1986	Tests on liquid paints (general and physical), Section 1 Sampling ( <i>third revision</i> )	IS 1070 : 2023	Reagent grade water — Specification ( <i>fourth revision</i> )
(Part 2/Sec 1) : 2018	Test on liquid paints (chemical examination), Section 1 Water content ( <i>fourth revision</i> )	IS 1303 : 1983	Glossary of terms relating to paints ( <i>second revision</i> )
(Part 6/Sec 2) : 1989	Durability test on paint films, Section 2 Keeping properties ( <i>third revision</i> )	IS 1745 : 2018	Petroleum hydrocarbon solvents — Specification ( <i>third revision</i> )
(Part 8/Sec 5) : 2022	Tests for pigments and other solids, Section 5 Lead restriction test ( <i>fourth revision</i> )	IS 2074 : 2015	Ready mixed paint, air drying, red oxide — Zinc chrome, priming — Specification ( <i>third revision</i> )
IS 110 : 2017	Ready mixed paint, brushing, grey filler, for enamels for use	IS 2932 : 2013	Enamel, synthetic, exterior: (a) Undercoating (b) Finishing — Specification ( <i>fourth revision</i> )

## ANNEX B

[Table 1 (ii)]

## DETERMINATION OF STOPPING PROPERTIES

## B-1 GENERAL

**B-1.1 Outline of the Method** — A mild steel panel is dented with a specified number of dents and then coated with primer and knifing stopper. It is then suitably examined at the dents for satisfactory stopping properties.

## B-2 PROCEDURE

**B-2.1** Dent a 300 mm × 150 mm × 0.900 mm mild steel panel with blunt iron ball hammer with 10 dents of about 3 mm diameter and 1 mm deep. The dents shall be so made that they are 50 mm away from the sides of the panel and 50 mm apart

from one another. Roughen the panel with emery paper No. 180. Wipe this with petroleum hydrocarbon solvent, 145/205 (low aromatic) (*see* IS 1745) and allow to dry. Apply a coat of red oxide-zinc chromate primer (*see* IS 2074) and allow to air-dry for 18 h. Over this, make one application of the material to a thickness of 1 000 µm (wet film thickness). Keep the panel vertical.

**B-2.2** The material shall be deemed to have passed the test if there is no sagging, shows no signs of crack and pinholes or appreciable shrinkage when observed 18 h after application.

## ANNEX C

[Table 1 (iii)]

## DETERMINATION OF RUBBING PROPERTIES

## C-1 GENERAL

**C-1.1 Outline of the Method** — The material in a specified film thickness is applied on a surface

prepared by coating with red oxide-zinc chromate primer. This film is then tested for its rubbing properties by rubbing with wet abrasive paper.

## C-2 PROCEDURE

**C-2.1** Brush on a mild steel panel, one coat of red oxide-zinc chromate primer (*see* IS 2074) and allow to dry for 18 h under laboratory drying conditions. Using putty knife, apply one coat of the material to give a dry film thickness of not less than 0.30 mm. Allow this to dry for 12 h under normal laboratory drying conditions.

**C-2.2** The film prepared as above shall be suitable for wet rubbing down with No. 220 waterproof

abrasive paper without any clogging of the paper. Eight rubs under moderate pressure should not remove the material to an extent as to expose the under surface. After rubbing down, the surface shall not show defects like roughness, scratches, cracks, pinholes, etc. These characteristics shall be compared with the registered sample which shall be submitted before bulk supply. Minor pinholes or scratches which will duly be filled by the subsequent coat of filler, shall not be the cause for rejection.

## ANNEX D

[Table 1 (iv)]

### DETERMINATION OF HOLD-OUT PROPERTIES

#### D-1 GENERAL

**D-1.1 Outline of the Method** — The film prepared, as for test under Annex A, is wet rubbed with abrasive paper and a coat of grey ready mixed filler brushed on it. The coat of the ready mixed filler is wet rubbed and a coat of finishing enamel applied on it, and the film is then observed for uniformity and absorption.

#### D-2 PROCEDURE

**D-2.1** Prepare a 300 mm × 150 mm × 0.900 mm mild steel panel and roughen it with emery paper. Wipe this with petroleum hydrocarbon solvent 145/205 (low aromatic) and allow to dry. Apply one coat of red oxide-zinc chromate primer (*see* IS 2074) and allow to air-dry for 18 h. Brush one coat of grey filler (*see* IS 110) and allow to dry for 18 h. Over this, make

4 applications of the material after an interval of 12 h between the applications in order to give a total film thickness of 1.25 mm. Allow the final coat of the material to dry for 12 h and wet rub with No. 180 to 220 abrasive paper. Wipe off and allow the coat to dry free from water. Brush on a coat of grey ready mixed filler (conforming to IS 110) and allow to dry for 18 h. Wet rub with No. 280 emery paper, wipe off and allow to dry free from water. Apply one coat of finishing enamel (*see* IS 2932) and allow to dry for 12 h.

**D-2.2** The material shall be deemed to have passed the test if the finish is uniform and shows equal absorption all over.

NOTE — For the purpose of testing, all the materials shall be from the same source.

## ANNEX E

(Clause 4.5)

### DETERMINATION OF ADHESION AND COMPATIBILITY IN PAINT SYSTEM

#### E-1 GENERAL

**E-1.1** This method is used to establish whether the adhesion of a coating to a substrate is at a generally adequate level. This does not distinguish between higher levels of adhesion for which more sophisticated methods of measurement are required.

#### E-2 APPARATUS

**E-2.1 Cutting Tool** — Sharp razor blade, scalpel, knife or other cutting devices. It is of particular importance that the cutting edges be in good condition.

**E-2.2 Cutting Guide** — Steel or other hard metal straight edge to ensure straight cuts.

**E-2.3 Tape** — 25 mm wide, semi-transparent pressure-sensitive tape with an adhesion strength of 446 g/mm ± 2.8 g/mm width. The backing of the

tape may consist of fibre-reinforced cellulose acetate, unplasticized (poly vinyl chloride) or polyester film.

**E-2.4 Rubber Eraser** — on the end of a pencil.

**E-2.5 Illumination** — A light source is helpful in determining whether the cuts have been made through the film to the substrate.

#### E-3 TEST SPECIMENS

**E-3.1** A paint system shall be prepared as described below:

- a) Clean the surface either by shot or grit blast, by phosphating, or by any appropriate chemical treatment;
- b) Brush immediately one coat of red oxide zinc chromate primer (*see* IS 2074) and allow to

dry for at least 18 h. Rub down with waterproof emery paper No. 220;

- c) Brush one coat of grey filler (*see* IS 110) and allow to dry for at least 12 h;
- d) Give 4 applications of the material, each application having a thickness of 0.25 mm to 0.40 mm of dry film at an interval of 12 h between the applications. The overall film thickness of 4 applications shall be about 1.25 mm, sufficient to take care of undulations and dents noticed in the sheet metal work. Allow the final coat to dry for 24 h;
- e) Wet rub the surface with No. 220 abrasive paper;
- f) Brush one coat of grey filler (*see* IS 110) and allow to dry for 18 h;
- g) Wet rub the filler with No. 240 or 280 waterproof abrasive and brush one coat of undercoating of gulf red colour (*see* IS 2932) and allow to dry for 12 h. Rub down with waterproof emery paper No. 320; and
- h) Brush one coat of gulf red synthetic enamel, finishing (*see* IS 2932), and allow to dry for 18 h before assessing the performance.

#### **E-4 PROCEDURE**

**E-4.1** Select an area free of blemishes and minor surface imperfections.

**E-4.2** Make two cuts in the film each about 40 mm long that intersect near their middle with an angle between 30° and 45°. When making the incisions,

use the straightedge and cut through the coating to substrate in one steady motion.

**E-4.3** Inspect the incisions for reflection of light from the metal substrate to establish that the coating film has been penetrated. If the substrate has not been reached make another cross in a different location. Do not attempt to deepen a previous cut as this may affect adhesion along the incision.

**E-4.4** Remove two complete laps of the pressure-sensitive tape from the roll and discard. Remove an additional length at a steady (that is, not jerked) rate and cut a piece about 75 mm long.

**E-4.5** Place the center of the tape at the intersection of the cuts with the tape running in the same direction as the smaller angles. Smooth the tape into place by finger in the area of the incisions and then rub firmly with the eraser on the end of a pencil. The colour under the transparent tape is a useful indication of when good contact has been made.

**E-4.6** Within 90 s  $\pm$  30 s of application, remove the tape by seizing the free end and pulling it off rapidly (not jerked) back upon itself at as close to an angle of 180° as possible.

**E-4.7** Repeat the test in two other locations on each test panel.

**E-4.8** The material shall be deemed to have passed the test if the stopper layer has a good adhesion over filler coat. Failure of adhesion between primer coat to metal surface, filler to primer coat or finish coat to fillers coat should not be the cause for rejection of stopper. Examination of failure should be confined to the stopper and filler interphase.

## ANNEX F

(Foreword)

## COMMITTEE COMPOSITION

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